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Amendments to the Claims:

This listing will replace all previous listings and versions of the claims in the application:

Listing of claims:

1. (Previously Presented) A system for the thermolytic eradication of microorganisms and biofilm in the root canal of a human tooth, said system comprising an elongated and flexible optical probe, a laser oscillator communicating with the distal end of said optical probe through at least one optical fiber, a power supply operatively connected to said laser oscillator, and a control operatively connected to said power supply and said laser oscillator;

(a) said optical probe being composed of a member of the class consisting of sapphire and zirconium, and having an optically diffusive surface dispersing optical energy throughout 360° laterally of said optical probe and along the entire length of said optical probe;

(b) said optical fiber ranging in diameter between 400 to 1000 μm;

(c) said optical probe ranging in diameter from ISO 20 to ISO 70;

(d) said laser oscillator generating radiation in two near infrared wavelength ranges including about 870 nm and 930 nm, respectively;

(e) said optical fiber being operatively connected between said laser oscillator and an ingress at the proximal end of said optical probe;

(f) said optical probe being sufficiently long for insertion into substantially the entire length of the root canal of said tooth;

(g) said optical probe causing lateral dispersion of said radiation from said probe throughout said root canal; and

(h) said control being configured and arranged for energizing said laser oscillator for dispersion of said radiation at an energy density and for a period of time sufficient to thermolyze said microorganisms and said biofilm in said root canal.

2. (Previously Presented) The system of claim 1, wherein said period of time is sufficient to destroy pathogenic microorganisms in said root canal.

3. (Previously Presented) The system of claim 1, wherein said laser oscillator is a diode, and said radiation is continuous mode radiation.

4. (Previously Presented) The system of claim 1, wherein said laser oscillator is a diode, and said radiation is gated continuous mode radiation.

5. (Previously Presented) The system of claim 1, wherein said laser oscillator is configured such that said radiation emitted as pulsed mode radiation.

6. (Previously Presented) A process for treatment of the root canal of a human tooth, said process comprising:

(a) preliminary removal of bacteria and biofilm from the entire elongated space of said root canal;

(b) debridement of said entire elongated space;

(c) insertion of an elongated optical probe into said entire elongated space;

(d) transmission of low infrared radiation of two wavelength ranges including about 870 nm and 930 nm, respectively, longitudinally into the entire length of said optical probe and laterally through the surface of said elongated probe to the surface of said root canal defining said space, and through the dentinal tubules adjoining said root canal space;

(e) said transmission being of sufficient energy density and sufficient time duration to thermolyze said biofilm and destroy remnants of said bacteria and in and adjacent to said root canal; and

(g) obturation of said space with an apical seal.

7. (Previously Presented) The process of claim 6, wherein said optical probe is composed of a member of the class consisting of sapphire and zirconium.

8. (Previously Presented) The process of claim 6, wherein said optical probe has an optically diffusive surface dispersing optical energy throughout 360° laterally of said optical probe and along the entire length of said optical probe.

9. (Previously Presented) The process of claim 6, wherein said radiation is transmitted from said laser to said probe via at least one optical fiber ranging in diameter between 400 to 1000 μm.

10. (Previously Presented) The process of claim 6, wherein said optical probe ranges in diameter from ISO 20 to ISO 70.

11. (Previously Presented) The process of claim 6, wherein said laser oscillator generates radiation at dual wavelengths including 870 nm and 930 nm, respectively.

12. (Previously Presented) A process for treatment of an infection in the root canal of a human tooth, said process comprising:

(a) mechanical and chemical removal of bacteria and biofilm from the elongated space of said root canal;

(b) mechanical shaping of said elongated space;

(c) insertion of an elongated optical probe into said elongated space;

(d) transmission of low infrared radiation longitudinally into the entire length of said optical probe and laterally through the surface of said elongated probe to the surface of said root canal defining said space;

(e) said transmission being of sufficient energy density and sufficient time duration to destroy remnants of said bacteria and biofilm in and adjacent to said root canal; and

(f) obturation of said space with an apical seal.

(g) said optical probe being composed of a member of the class consisting of sapphire and zirconium;

(h) said optical probe having an optically diffusive surface dispersing optical energy throughout 360° laterally of said optical probe and along substantially the entire length of said optical probe;

(i) said radiation being transmitted from said laser to said probe via at least one optical fiber ranging in diameter between 400 to 1000 μm;

(j) said optical probe ranging in diameter from ISO 20 to ISO 70; and

(k) said laser oscillator being configured and arranged for generating radiation in two near infrared wavelength ranges including about 870 nm and 930 nm, respectively.

13. (Previously Presented) The process of claim 12, wherein the infection includes Fusobacterium,

14. (Previously Presented) The process of claim 12, wherein the infection includes Peptostreptococcus.

15. (Previously Presented) The process of claim 12, wherein the infection includes Eubacterium.

16. (Previously Presented) The process of claim 12, wherein the infection includes Prevotella.

17. (Previously Presented) The process of claim 12, wherein the infection includes Lactobacillus.

18. (Previously Presented) The process of claim 12, wherein the infection includes Streptococcus.

19. (Previously Presented) The process of claim 12, wherein the infection includes Bacteroides.

20. (Previously Presented) The process of claim 12, wherein the infection includes Enterococcus.

21. (Previously Presented) The process of claim 12, wherein the infection includes Actinomyces.

22. (Previously Presented) The process of claim 12, wherein the infection includes Propionibacterium.

23. (New) A system for creating a photodamage effect for the eradication of microorganisms and biofilm that can be applied for the treatment of a root canal of a human tooth, said system comprising an elongated and flexible optical probe, a laser oscillator communicating with the distal end of said optical probe through at least one optical fiber, a power supply operatively connected to said laser oscillator, and a control operatively connected to said power supply and said laser oscillator;

(a) said optical probe being composed of a member of the class consisting of sapphire and zirconium, and having an optically diffusive surface dispersing optical energy throughout 360° laterally of said optical probe and along the entire length of said optical probe;

(b) said optical fiber ranging in diameter between 400 to 1000 μm;

(c) said optical probe ranging in diameter from ISO 20 to ISO 70;

(d) said laser oscillator generating radiation at two near infrared wavelengths including about 870 nm and 930 nm, respectively;

(e) said optical fiber being operatively connected between said laser oscillator and an ingress at the proximal end of said optical probe;

(f) said optical probe being sufficiently long for insertion into substantially the entire length of the root canal of said tooth;

(g) said optical probe causing lateral dispersion of said radiation from said probe throughout said root canal; and

(h) said control being configured and arranged for energizing said laser oscillator for dispersion of said radiation at an energy density and for a period of time sufficient to produce a desired photodamage effect in said microorganisms and said biofilm.

24. (New) The system of claim 23, wherein said period of time is sufficient to destroy pathogenic microorganisms in said root canal.

25. (New) The system of claim 23, wherein said laser oscillator is a diode, and said radiation is continuous mode radiation.

26. (New) The system of claim 23, wherein said laser oscillator is a diode, and said radiation is gated continuous mode radiation.

27. (New) The system of claim 23, wherein said laser oscillator is configured such that said radiation emitted as pulsed mode radiation.

28. (New) A process for treatment of the root canal of a human tooth, said process comprising:

(a) preliminary removal of bacteria and biofilm from the entire elongated space of said root canal;

(b) debridement of said entire elongated space;

(c) insertion of an elongated optical probe into said entire elongated space;

(d) transmission of low infrared radiation at two wavelengths including about 870 nm and 930 nm, respectively, longitudinally into the entire length of said optical probe and laterally through the surface of said elongated probe to the surface of said root canal defining said space, and through the dentinal tubules adjoining said root canal space;

(e) said transmission being of sufficient energy density and sufficient time duration to produce a desired photodamge effect in said biofilm and destroy remnants of said bacteria in and adjacent to said root canal; and

(g) obturation of said space with an apical seal.

29. (New) The process of claim 28, wherein said optical probe is composed of a member of the class consisting of sapphire and zirconium.

30. (New) The process of claim 28, wherein said optical probe has an optically diffusive surface dispersing optical energy throughout 360° laterally of said optical probe and along the entire length of said optical probe.

31. (New) The process of claim 28, wherein said radiation is transmitted from said laser to said probe via at least one optical fiber ranging in diameter between 400 to 1000 μm.

32. (New) The process of claim 28, wherein said optical probe ranges in diameter from ISO 20 to ISO 70.